



Mark schemes

Q1.

(a)

Classification group
Kingdom
Phylum
Class
Order
Family
Genus
Species

all 4 correct = 2 marks
2 or 3 correct = 1 mark
0 or 1 correct = 0 marks

2

 (b) *Geospiza fortis*

ignore underlining or attempted italics or upper and lower case letters

1

(c) offspring have similar beak depths to parents

ignore same beak depths
ignore positive correlation / described

1

(d) parents of a given beak depth produce offspring with several beak depths

allow spread of results for a given parental beak depth about line of best fit
allow range of phenotypes for a given parental beak depth

1

(e) colonisers of Isabela have a range of beak depths

allow colonisers of Daphne have a range of beak depths

1

due to different combinations of alleles of several genes
 or
 due to different alleles of one gene
 or

due to mutation	1
large range of (sizes / species of) seeds / food (on Isabela) or large(r) seeds (on Isabela) <i>allow small range of (sizes / species of) seeds / food on Daphne</i> or <i>allow small(er) seeds on Daphne</i>	1
more competition for seeds / food (on Isabela) <i>allow less competition for seeds / food on Daphne</i> <i>ignore competition unqualified</i>	1
birds with larger beaks get enough food to (survive and) reproduce (on Isabela) <i>allow birds with smaller / medium beak sizes get enough food to (survive and) reproduce on Daphne</i>	1
(survivors) pass on (beneficial) alleles to offspring <i>allow pass on genes / mutation ignore pass on chromosomes / characteristics</i>	1
(f) Isabela is a large island with more species of plants or Isabela is a large island with more variety in seed / food sizes or Isabela is a large island with more plants / seeds / food	1
less competition for seeds / food or enough seeds / food for both bird species	1
	[13]
Q2.	
(a) <i>Elasmotherium</i>	1
(b) eukaryota	1
(c) Carl Woese	1
(d) any one from:	

- fighting / competing for mates / food / territory
 - to kill predators / prey
allow for defence / protection
- 1
- (e) (bones or hard tissues) did not decay
allow soft tissues decayed or were eaten
allow other parts decayed or were eaten
allow horn could be damaged / lost in fighting
- 1
- (f) any one from:
- compare to other fossils of known age
allow compare with the fossil record
 - by the age of the rocks (where fossil was found)
allow depth underground (where fossil was found)
allow (radio)carbon / isotope dating
allow DNA analysis
- 1
- (g) 0.05 (million years ago)
- 1
- (h) 0.2 – 0.05
allow 0.05 × 3
allow ecf from question (g)
- 1
- 0.15
- 1
- 150 000 (years)
allow 0.15 million (years)
- 1
- (i) any two from:
- ignore pollution*
- drought
 - ice age / global warming
 - volcanic activity
allow earthquakes / tsunami
 - asteroid / meteor collision
 - (new) predators
allow hunters / poachers / eaten
 - (new) disease
allow named pathogen
 - competition for food
allow lack of food
 - competition for mates
allow isolation or lack of mates

- lack of habitat or habitat change
if no other marks awarded allow natural disaster or climate change or catastrophic event for 1 mark

2

[12]

Q3.

- (a) same kingdom + phylum + class + order or same order
or
they have the top four groups the same
allow both Poales

1

- (b) Rr / rR
do not accept RR or rr
ignore heterozygous
do not accept homozygous

1

- (c) CWCW

1

- (d)
allow R and W throughout
allow own symbols if defined

parental genotypes / gametes correct for both parents:

 $C^R C^W$ CR CW / CR and CW

1

genotypes of offspring correctly derived in a Punnett square:

CRCR CRCW CWCW

allow correctly derived genotypes from incorrect gametes

1

correct identification of phenotypes from their cross:

CRCR = red

CRCW = pink

CWCW = white

allow colours correctly identified from different offspring, only if pink and other colour(s) are given

1

- (e) answer correctly derived from part (d) to match stated phenotypes *allow 50(%) if no offspring given in part (d)*
allow to match genotypes if no phenotypes given

1

- (f) *(several groups)*
 so many / several plants can be produced
allow each (group) will give a new plant 1
- (nutrients)*
 for making protein / amino acids or for making
 chlorophyll or for providing energy or for
 respiration
allow other examples
do not accept making energy
ignore for growth 1
- (add hormones)*
 so differentiation occurs or so roots / shoots develop
allow for the formation of different
tissues / organs / named
allow to stimulate cell division 1
- (sterile conditions)*
 to prevent growth / entry of microorganisms /
 named type or prevent decay / disease
ignore to kill microorganisms
ignore contamination unqualified 1
- (temperature = 20 °C)*
 so optimum / good growth
allow reference to enzymes working
well
ignore enzymes not denatured
ignore reference to pathogens /
microorganisms 1
- (g) (all new plants have been) produced by asexual
 reproduction / mitosis or produced without (fusion of)
 gametes
ignore produced from one parent 1
- (so) all are genetically identical / clones or all are
 CRCW / heterozygous
allow all are the same genotype / alleles
/ genes / DNA 1
- [14]

Q4.

(a)

Classification group	Name
Class	<i>Mammalia</i>
Order	<i>Primates</i>
Family	<i>Lemuroidea</i>
Species	<i>catta</i>

all 4 correct = 2 marks
2 or 3 correct = 1 mark
0 or 1 correct = 0 marks

2

(b) Lemur catta

ignore capitalisation / non-capitalisation
of initial letters

ignore italics / non-italics

ignore underlining / non-underlining

1

(c) carried by (favourable) currents on masses of vegetation

allow description of currents from Figure
2

ignore swimming

1

(d) isolation of different populations

1

habitat variation between lemur populations

allow examples – biotic (e.g. food /
predators) or abiotic (e.g. temperature)

1

genetic variation or mutation (in each population)

1

better adapted survive (reproduce) and pass on (favourable) allele(s)
 to offspring

allow natural selection or survival of the
fittest and pass on (favourable) allele(s)
to offspring

allow gene(s) / mutation as an
alternative to allele(s)

1

(eventually) cannot produce fertile offspring with other populations *allow*
cannot reproduce 'successfully'
with other populations

ignore cannot reproduce unqualified

1

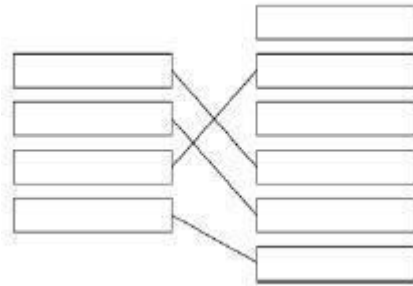
[9]

Q5.

(a) Carl Linnaeus 1

(b) Lithops 1

*extras cancel
ignore capitalisation / non-capitalisation*



(c) 1
1
1
1

*1 mark per line
extra line from adaptation negates the mark for that adaptation*

(d) any two from:
 • cooler underground / at night or the jerboa can keep cool
 • loses less water or sweats less
 • less likely to be seen (by predators / prey) 2

(e) behavioural 1

[9]